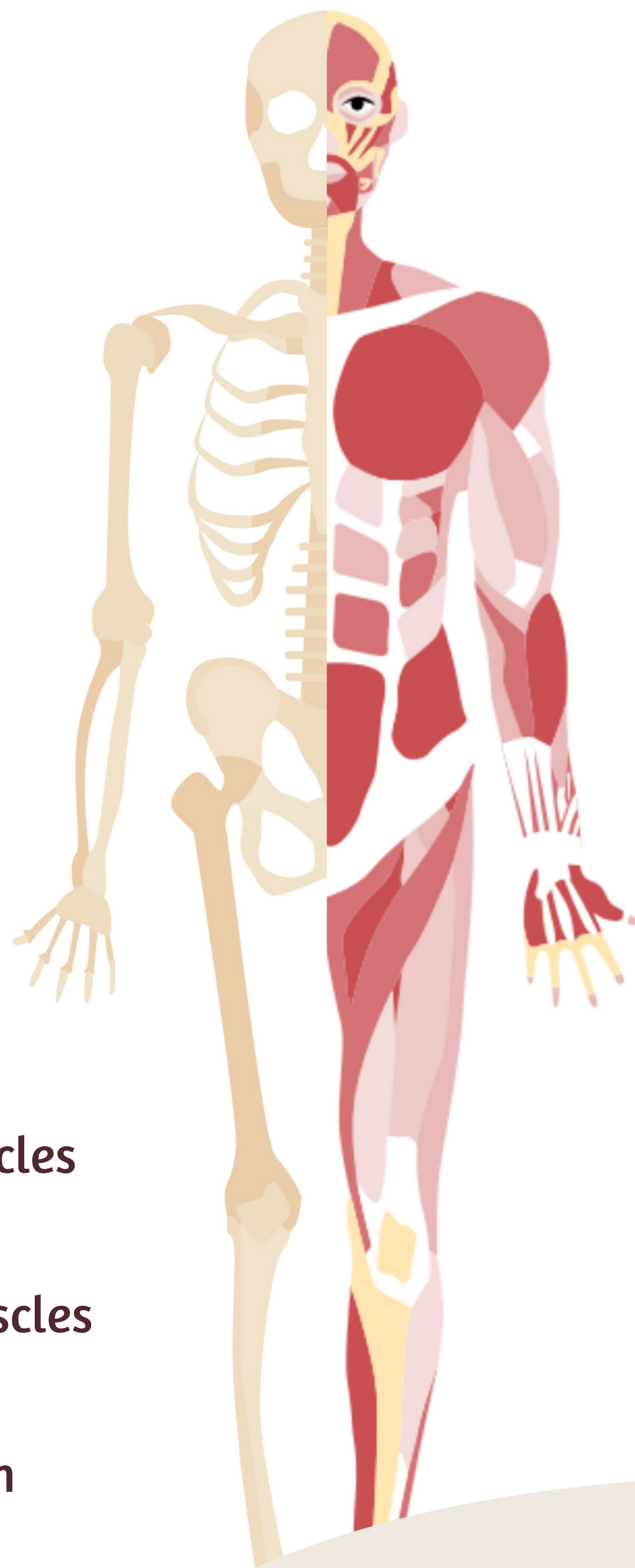


Lecture 8

ANATOMY OF THE FOREARM

OBJECTIVES

- List the names of the Flexors Group of Forearm (superficial & deep muscles).
- Identify the common flexor origin of flexor muscles and their innervation & movements.
- Identify supination & pronation and list the muscles produced these 2 movements.
- List the names of the Extensor Group of Forearm (superficial & deep muscles).
- Identify the common extensor origin of extensor muscles and their innervation & movements.



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- Main text
- Boys' Slides
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- Important
- Dr's Notes
- Extra

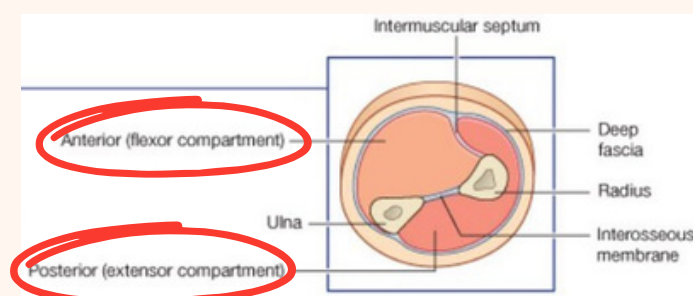
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Forearm

Forearm

- The forearm extends from the elbow to wrist.
- It posses two bones **radius** laterally and **ulna** medially.
- The two bones are connected together by the **interosseous membrane**.
- This membrane allows movement of **pronation and supination** while the two bones are connected together.
- also it gives origin for the deep muscles.

Fascial compartment of Forearm



- The forearm is enclosed in a **sheath of deep fascia**, which is attached to the **posterior border of ulna**. (it encircles the forearm completely (Without touching the radius) and return again to the posterior border of the ulna).
- This **fascial sheath** together with the **interosseous membrane** and fibrous **intermuscular septa** divides the forearm into compartments each having its own muscles, nerves and blood supply. (The radius and ulna are connected by 3 structures: the interosseous membrane, superior radioulnar joint and inferior radioulnar joint).

consists of 8 muscle

They act on the **elbow and wrist joints** and the **fingers**.

Anterior compartment-flexor group

They are arranged in Three groups which are : **Superficial - Intermediate - Deep**

They form **fleshy** masses in the **proximal part** and become **tendinous** in the **distal part** of the forearm.

Flexor group

Superficial: 4 muscles

- Pronator teres
- Palmaris longus
- Flexor Carpi radialis
- Flexor Carpi ulnaris

Intermediate: 1 muscle

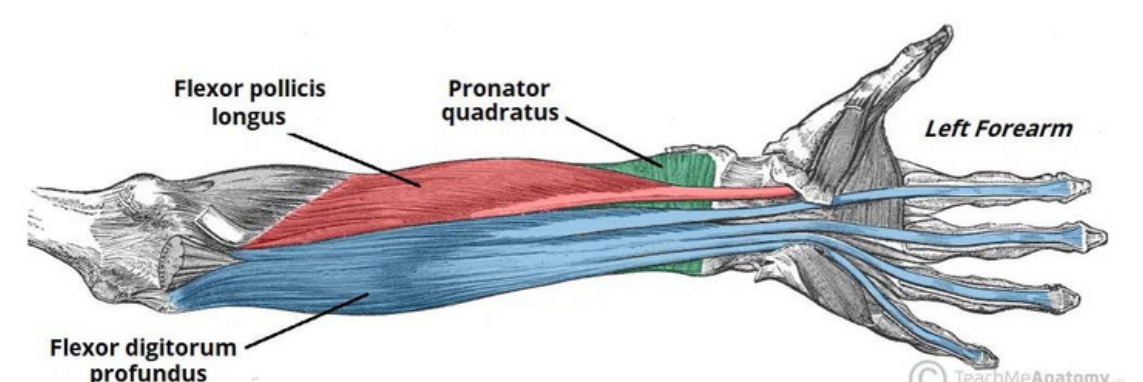
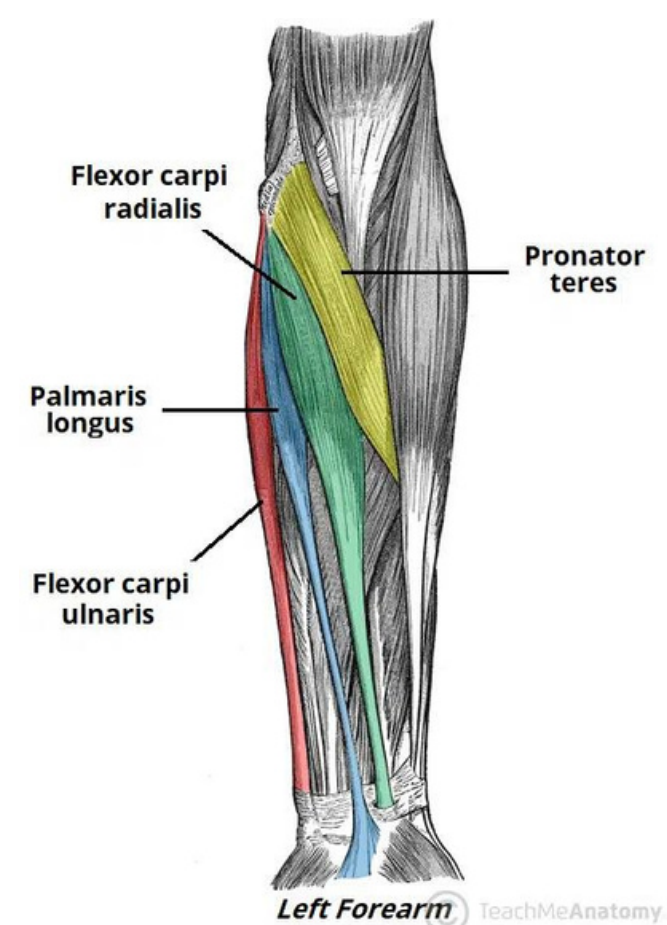
- Flexor digitorum superficialis

Deep: 3 muscles

- Flexor digitorum profundus
- Flexor pollicis longus
- Pronator quadratus

The anterior (flexor) group, which includes pronator teres, arises from the common flexor attachment, the medial epicondyle the Humerus.

The extensor group, which includes supinator, arises from the common extensor attachment, the lateral epicondyle of the humerus.



Med442/

Females dr: you can include the intermediate muscle as a superficial muscle.

Medical Gross Anatomy



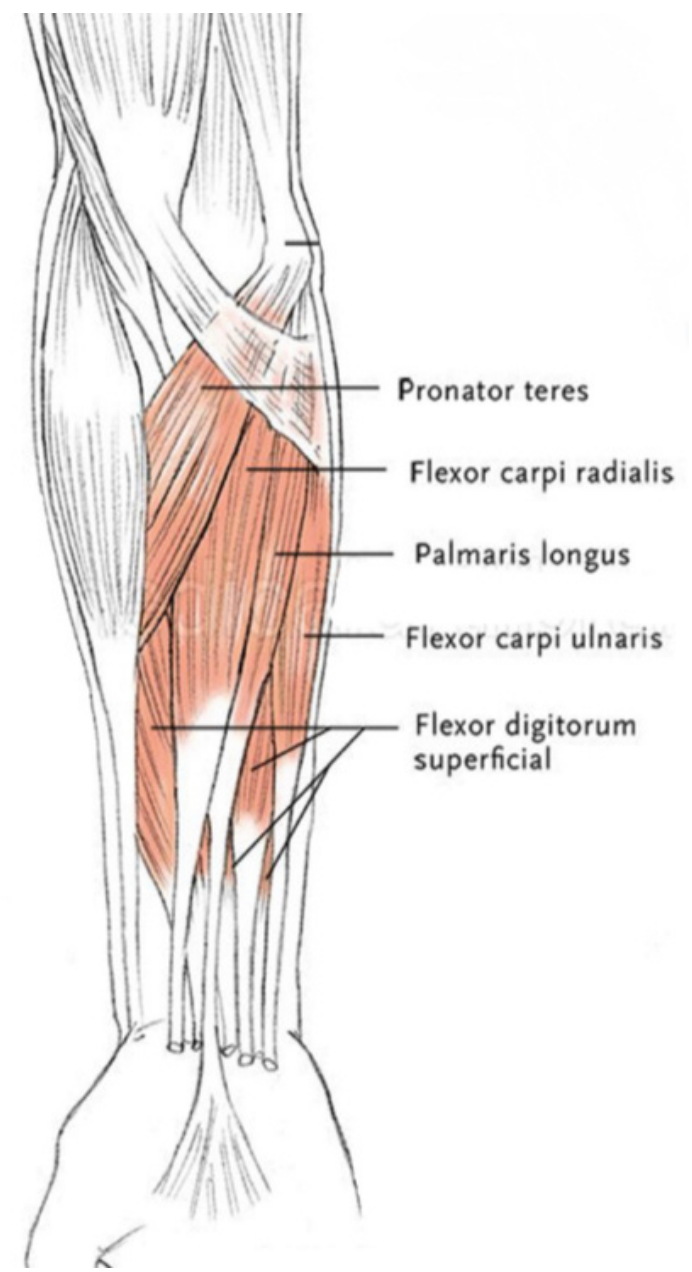
Superficial flexors

Med442 Note : the medial for superficial flexors and the lateral for the superficial extensors in the posterior compartment of the forearm

✦ They arise - more or less from the common flexor origin (front of medial epicondyle).

✦ All are supplied by median nerve EXCEPT one, flexor carpi ulnaris (FCU) which is supplied by the ulnar nerve.
Ulnar half of FDP (deep muscle)

✦ All cross the wrist joint EXCEPT one, pronator teres (PT).

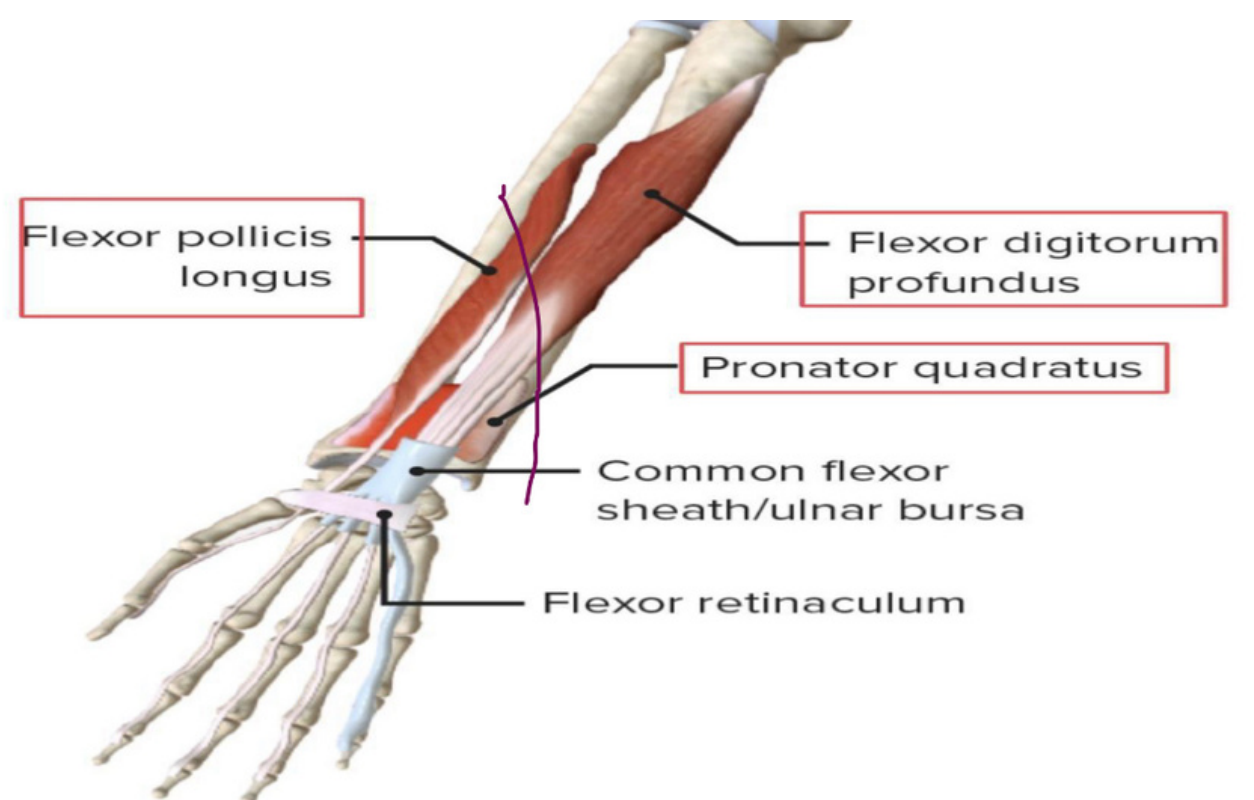


From lateral to medial:

1. Pronator teres
2. flexor carpi radialis
3. palmaris longus
4. flexor digitorum superficialis
5. flexor carpi ulnaris

Muscle	Pronator Teres	Flexor carpi radialis	Palmaris longus <i>(maybe absent)</i>	Flexor carpi unlaris	Flexor digitorum superficialis <i>(intermediate group)</i>
Origin	Common flexor origin (front of medial epicondyle) more or less				Common flexor origin, • Coronoid process of ulna; • Anterior surface of radius
Insertion	middle of lateral surface of radius. <i>(does not cross wrist).</i>	the Base of 2nd metacarpal bone.	into the flexor retinaculum <i>in wrist</i> & palmar aponeurosis <i>in hand.</i>	Pisiform, Hook of hamate, 5th metacarpal bone.	base of middle phalanges of medial 4 fingers.
Nerve supply	Median nerve			Ulnar nerve	Median nerve
Action	<ul style="list-style-type: none"> Pronation <i>(main action)</i> Flexion of forearm (Elbow) 	<ul style="list-style-type: none"> - Flexion of <i>wrist and elbow</i> - abduction of the hand 443 Dr : <i>(any muscle will be under radius will make abduction And under ulna Will make adduction)</i> 	Flexes hand (wrist) <i>and elbow</i> and tightens palmar aponeurosis	<ul style="list-style-type: none"> - Flexion - Adduction <i>(with extensor carpi ulnaris)</i> of the hand (wris) 	Flexes middle and proximal phalanges of medial 4 fingers, and the hand

Deep flexor group of forearm



Helpful Video



Helpful Video



Helpful Video

Muscle	Flexor digitorum profundus (above ulna)	Flexor pollicis longus (above radius)	Pronator quadratus (above 2 bones) Looks like a watch
Insertion	bases of distal phalanges of medial 4 digits	Base of distal phalanx of thumb	distal fourth of ant. surface of radius
Nerve supply all by anterior interosseous nerve EXCEPT medial half of flexor digitorum profundus	<ul style="list-style-type: none"> • Medial ½ by ulnar Nerve. • Lateral ½ : by anterior interosseous nerve (branch of median N.) Dr 443 : supply by double nerve	anterior interosseous nerve (branch of median N.)	anterior interosseous nerve (branch of median N.)
Action	<ul style="list-style-type: none"> • Flexes distal phalanges of medial 4 digits. Flexes the hand (wrist).	<ul style="list-style-type: none"> • Flexes all joints of the thumb (interphalangeal, metacarpophalangeal, carpometacarpal). 	<ul style="list-style-type: none"> • pronates the forearm (prime mover). • helps to hold the bones together (ulna and radius)

Supination and pronation

- ◆ It occurs in the superior and inferior radioulnar joints.

Muscles that produce supination:

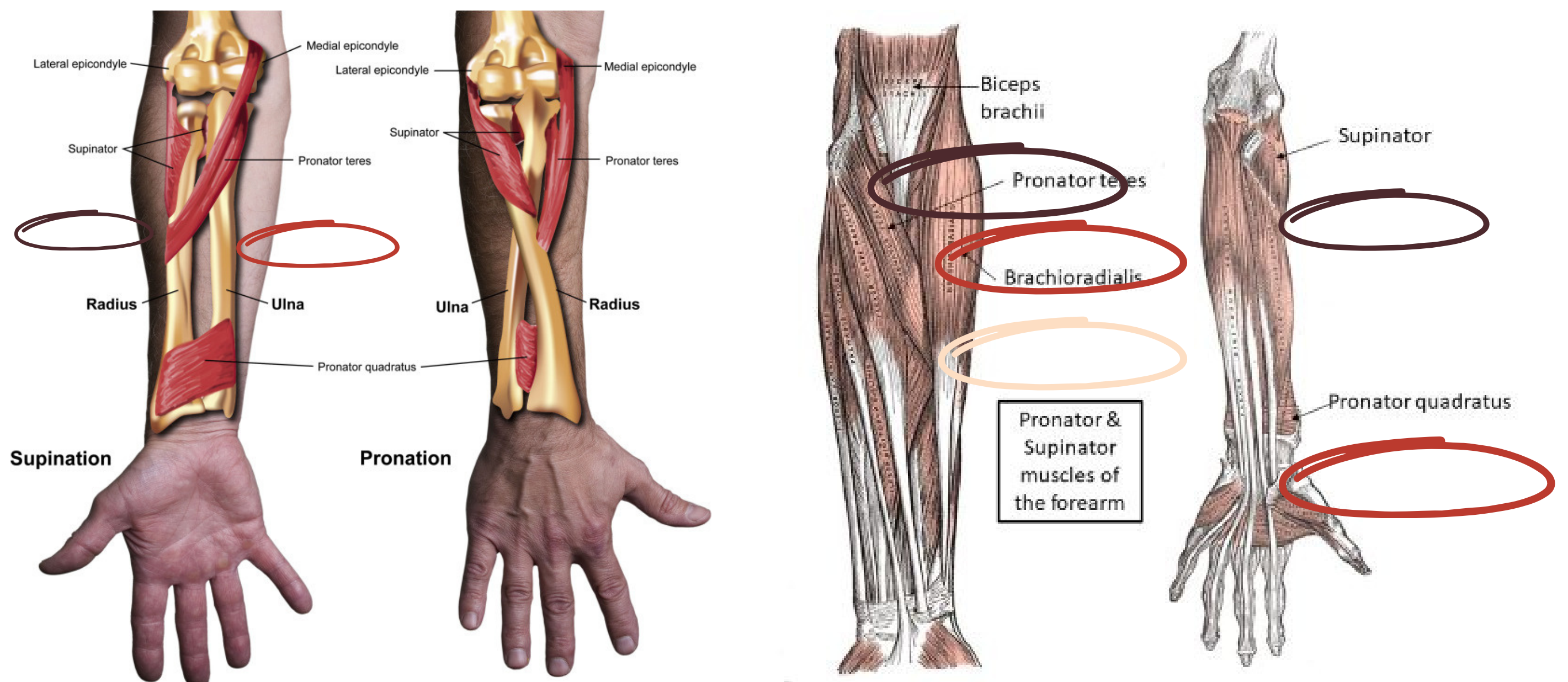
- Biceps brachii (strong supinator)
- Supinator

Note from 441 :
in case of a fully extended arm the supinator muscle is the main muscle in supination, otherwise it's the biceps.

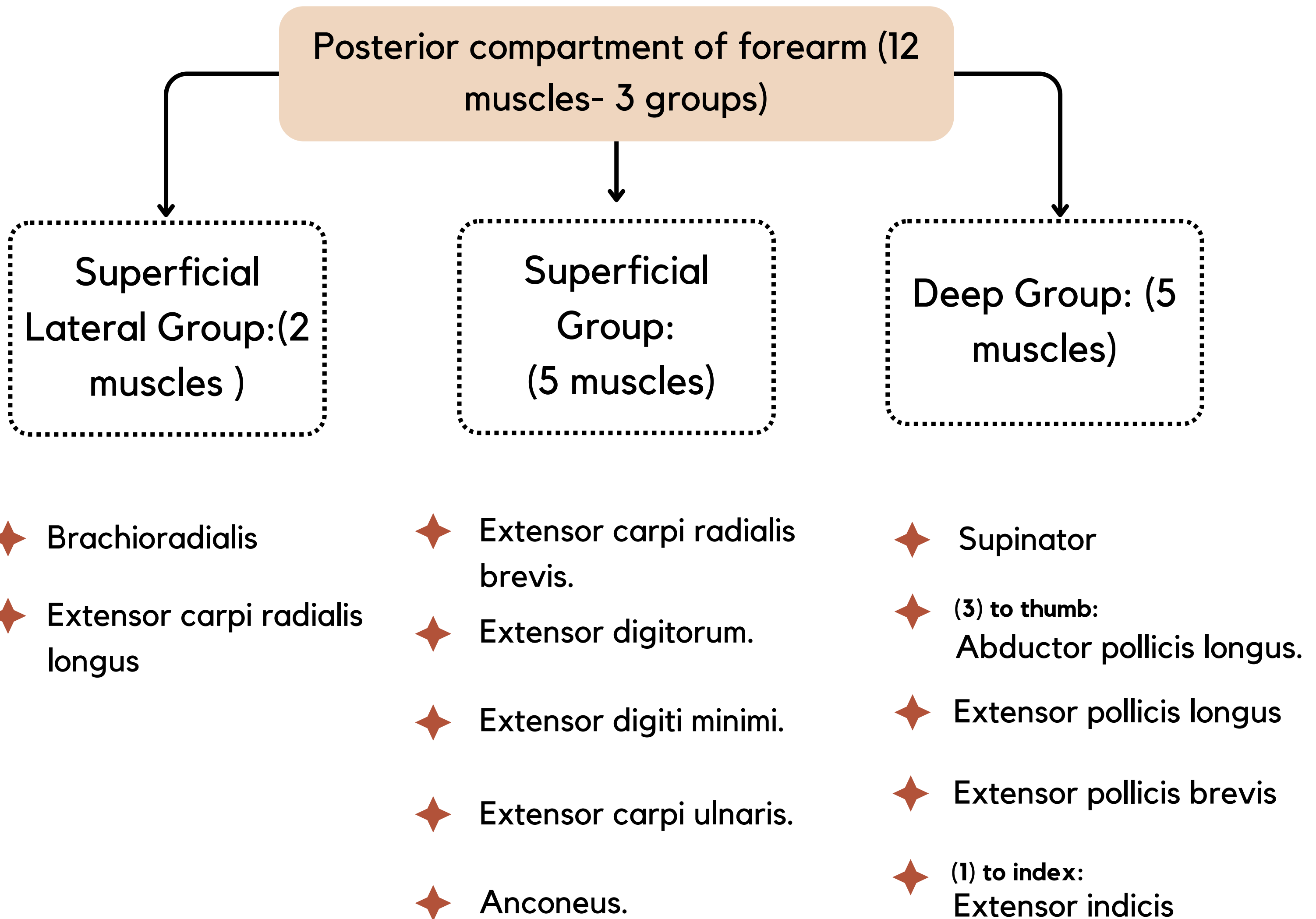
Muscles that produce pronation:

- Pronator quadratus (**prime mover**)
- Pronator teres

Brachioradialis (**posterior compartment of forearm but more in radial site**)
put the forearm in mid-prone position



Posterior compartment of forearm



Origin

all arise from the common extensor origin
(front of the lateral epicondyle)

Posterior compartment of forearm

- ✦ All arise from the **common extensor origin**, (front of lateral epicondyle of the humerus), **EXCEPT 2 (BR & ECRL)**.
- ✦ All cross the wrist **EXCEPT one, Brachioradialis**
- ✦ Nerve supply: All supplied by **deep branch of radial nerve** (posterior interosseous nerve), **EXCEPT ABE** are supplied by **the radial nerve itself**.
- ✦ **ABE = Anconeus, Brachioradialis and Extensor carpi radialis longus.**



In the next slide the muscle are from the lateral to medial

	superficial group	
Muscle	Brachioradialis (BR)	Extensor carpi radialis longus (ECRL)
Origin	Lateral supracondylar ridge of humerus.	
Insertion	Base of styloid process of radius	Posterior surface of base of 2nd metacarpal bone .
Action	<ul style="list-style-type: none"> - Flexes forearm(elbow). - Rotates forearm to midprone position 	Extends and Abducts hand (radial rotation) at wrist joint.

Superficial extensors

Insertion:

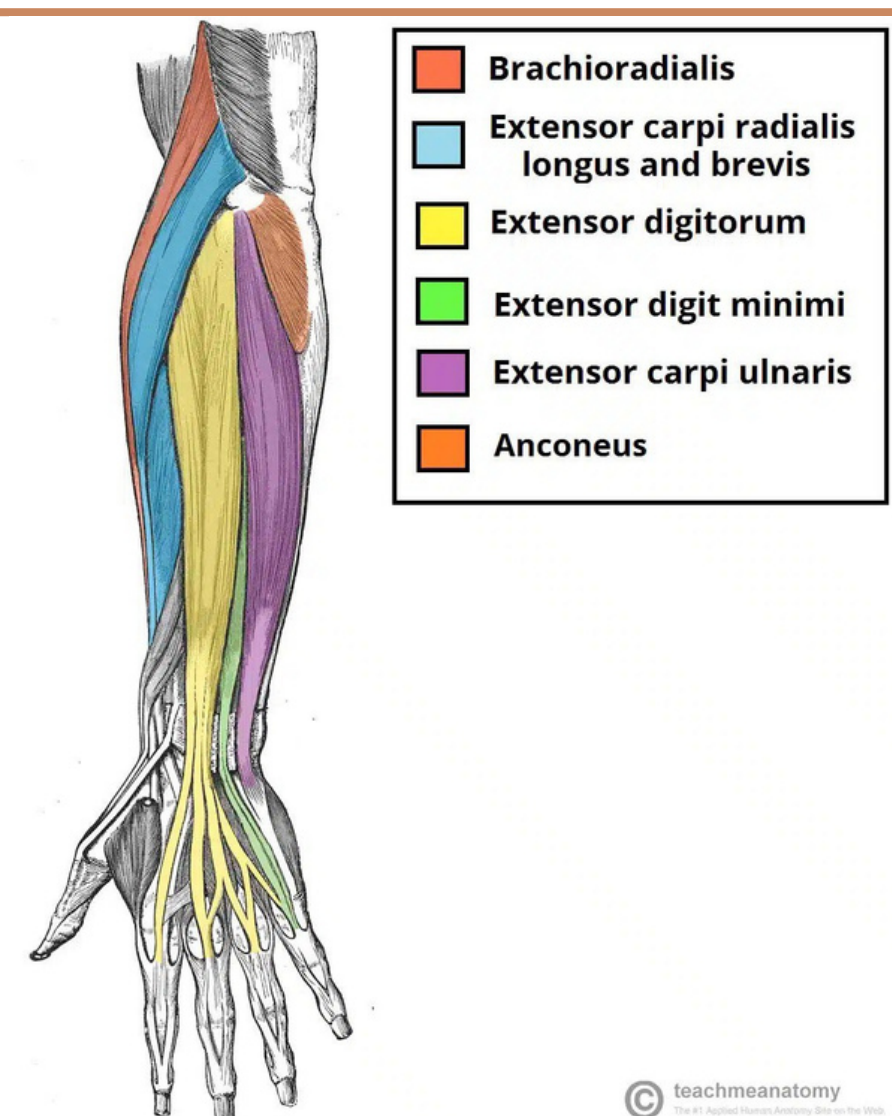
Extensor carpi radialis brevis: base of 3rd metacarpal bone.

Extensor digitorum: Extensor expansion of the medial 4 fingers.

Extensor digiti minimi: Extensor expansion of the little finger.

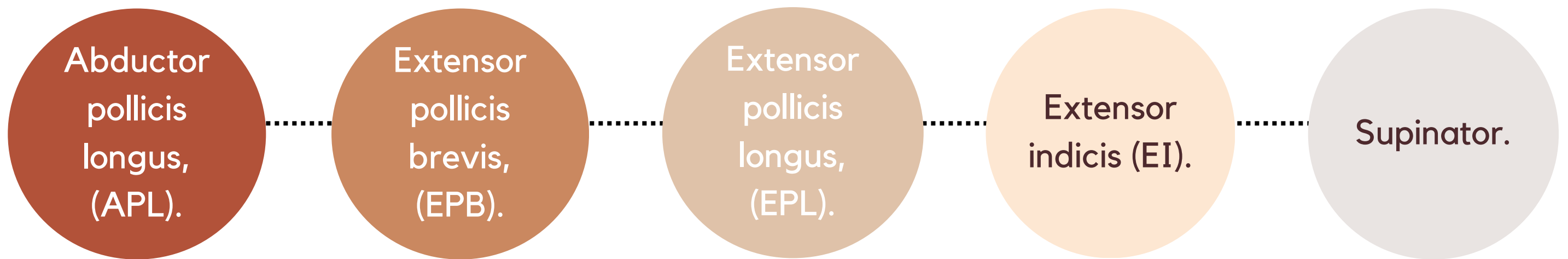
Extensor carpi ulnaris: Base of the 5th metacarpal bone.

Anconeus : Upper back of shaft of ulna.



Posterior compartment deep group

5 muscles : (3 to the thumb+1 to index & supinator)



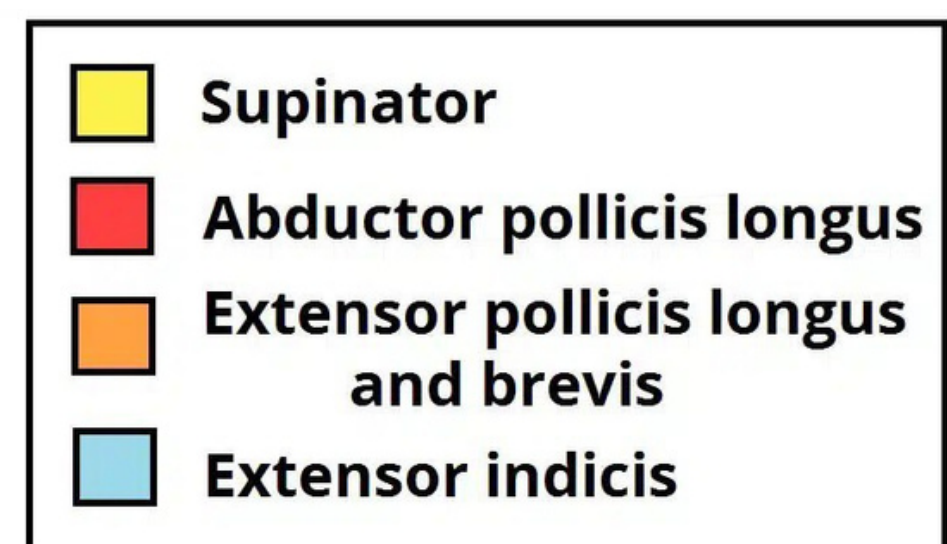
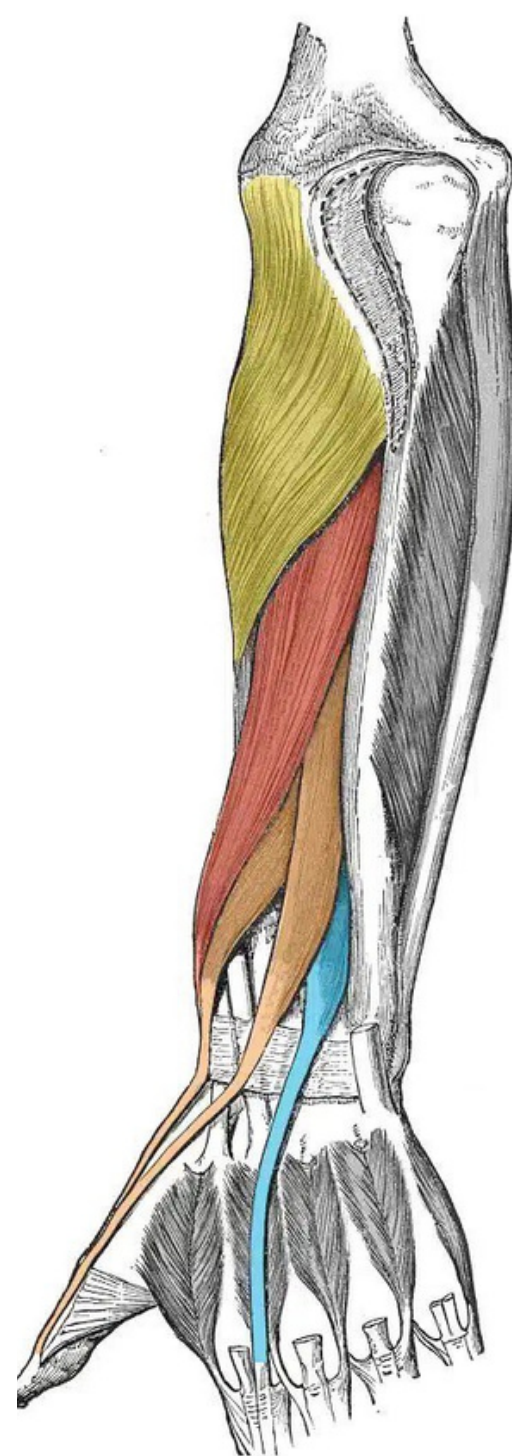
All back muscles of forearm are supplied by: **posterior interosseous nerve**, except ABE by Radial nerve.

Dorsal extensor expansion:

It is formed on the dorsum of medial 4 fingers by the union of the long extensor tendons:

- Extensor digitorum
- Extensor digiti minimi
- Extensor indicis with palmar & dorsal interossei & lumbricals muscles

All these tendons unite to form one tendon (dorsal Extensor tendon) which divides into 3 slips, a median one attached to middle phalanges and 2 lateral attached to the terminal phalanges.



MCQs

1

Which of the following muscles is not supplied by the median nerve?

A-Pronator teres

B-Flexor carpi ulnaris

C-Palmaris longus

D-Flexor carpi radialis

2

Which of the following muscles has a double nerve supply?

A-Flexor digitorum profundus

B-Flexor Pollicis Longus

C-Pronator Quadratus

D-Palmaris longus

3

Which of the following muscles has three origins?

A-Flexor carpi ulnaris

B-Pronator teres

C-Flexor Digitorum superficialis

D-Palmaris longus

4

Which of the following muscle does not flex the hand or the wrist ?

A-Pronator teres

B-Palmaris longus

C-Flexor carpi ulnaris

D-Flexor carpi radialis

5

All of the following muscles don't cross the wrist joint except ?

A-Anconeus

B-Pronator teres

C-Brachioradialis

D-Extensor indicis



1.B 2.A 3.C 4.A 5.D

MCQs

6

Which muscle is bends the wrist and finger and it located on the lateral side of arm?

A-Supinator

B-Flexor Carpi Ulnaris

C-Flexor Carpi Radialis

D-Palmaris Longus

7

The muscle that responsible for turn the palm upward is?

A-Supinator

B-Flexor Carpi Ulnaris

C-Flexor Carpi Radialis

D-Pronator teres

8

Which of the following muscle is originate from the Lateral supracondylar ridge?

A-Brachioradialis

B-Extensor Carpi Radialis

C-Extensor digiti minimi

D-A and B

9

Which of the following muscle is supplied by the radial nerve directly?

A-Extensor digiti minimi

B-Extensor carpi ulnaris

C-Anconeus

D-Extensor digitorum

10

Which of the following nerves supply the extensors Muscle of the forearm ?

A-Radial nerve

B-Median nerve

C-Ulnar nerve

D-Musculocutaneous



6.C 7.D 8.D 9.C 10.A

SAQs

Numerical muscles that have common flexor origin?

1

1. pronator teres
2. flexor carpi radialis
3. palmaris longus
4. flexor digitorum superficialis
5. flexor carpi ulnaris



Which muscles produce supination?

2

1. Biceps brachii
2. Supinator



What is the nerve supply of posterior compartment (deep group)?

3

Posterior interosseous nerve





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